PATENT SPECIFICATION

789,408

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International Classification:—B23d.

COMPLETE SPECIFICATION

Improvements in or relating to Punching Apparatus

I, JOHAN WILLEM OCENASEK, of 200, Wagenwey, Haarlem, The Netherlands, a Subject of the Queen of The Netherlands, do hereby declare the invention, for which I pray that a patent may be granted to me and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to a punching apparatus having a perforating punch, a tubular stripper, a spring between the stripper and the punch and an outer casing embracing these parts and arranged to prevent the parts from leaving the casing through one end thereof. Such a punching apparatus is known from U.S. Specification No. 2,168,377, according to which a punching press comprises a bed and a ram movable one relatively to the other, a die unit mounted on the bed, and a punch unit mounted on the ram and including a one-piece tubular punch holder secured at its upper end to the ram, a punch arranged within the punch holder and having its lower bit end projecting beyond the punch holder and adapted to co-operate with said die and provided at its upper end with an integral collar which is secured between the underside of the ram and an upwardly facing shoulder on the punch holder, a tubular stripper movable lengthwise between the lower parts of the punch and the punch holder and limited in its downward movement and an ejector spring arranged between said punch and punch holder and operating to project said stripper and engaging its upper end with said collar. This known apparatus has the disadvantage, however, that the punch, the stripper and the spring are only secured within the outer casing when the apparatus is secured in or to a punch holder. The unitary punching apparatus hence cannot be regarded as a unit, so that on handling the punching apparatus parts of it are liable to fall out and may get lost. In view of the rough handling to which punching apparatus is often subjected in factories and during storage and transport, this is a serious defect. According to U.S. Specification No. 2,225,342, this defect is obviated by securing the perforating punch and the stripper in the unitary punching apparatus by preventing these parts from leaving the outer casing not only at one end, but also at the other end thereof. In accordance with Specification No. 2,225,342, a stripping device for attachment to a punch comprises, in combination, a pair of elements spring pressed away from one another, one of said elements being circular in formation and carrying a pair of metal fingers extending radially inwardly from opposite sides of the element and terminating in spaced relationship to one another, the distance separating the adjacent ends of said fingers being less than the shank of the punch to which the device is to be attached and being free to flex outwardly as they grippingly engage said shank of the punch.

With a punching apparatus of this kind, the punch may clearly be secured in the outer casing in such a way that it cannot move with respect to such outer casing, since during operation only the stripper need be movable with respect to the punch, but the outer casing may be immovable with respect to the punch. The present invention, however, is based on the view that it is of advantage to render the punch movable with respect to the outer casing.

According to the invention, there is provided punching apparatus having a perforating punch, a tubular stripper, a spring between the stripper and the punch and an outer casing embracing these parts and preventing separation of these parts from the casing, in which the punch is adjustable with respect to the outer casing and the stripper in such a manner that the punch can be adjusted so as to protrude from the stripper.

This construction presents special advant-

[Price

ages when holders for punching apparatus are to be located with respect to a supporting bed of a press. It is known from U.S. Specification No. 1,955,866, in particular Figs. 19-22 thereof, to locate such holders with respect to the supporting bed by means of pilot pins mounted in holders, the pins being inserted in predetermined holes in a templet and the holders being fixed on the supporting bed. The use of the punching apparatus according to the invention permits a method whereby the punch holders, after the punches have been pressed outwards by means of the adjusting member, are placed in the correct position with respect to the templet, whereupon the punch holders pertaining thereto are secured with respect to the supporting bed. Since with the method according to the invention the punches themselves are used as pilot pins, the use of separate pilot pins may be dispensed with, which constitutes an important simplification in the use of punching apparatus.

In one preferred embodiment of the invention, the end of the outer casing remote from the active end of the punch is provided with a pressing member, most suitably secured by means of a screw thread, against which the head of the punch rests, with the addition, if desired, of intermediate spacing plates, the pressing member carrying the adjusting member for pressing the punch outwards. This adjusting member may comprise an adjusting screw inserted axially into the pressing member, but may also comprise a wedge or eccentric provided in a transverse bore of the pressing member.

The invention is explained in detail below with reference to the accompanying drawings, in which:—

Figs. 1 and 2 show axial sections of a punching apparatus including the die pertaining thereto, Fig. 1 representing a first and Fig. 2 a second embodiment;

Fig. 3 shows an axial section of a further form of punching apparatus, together with the die pertaining thereto;

Fig. 4 shows a view from below of the construction according to Fig. 3;

Figs. 5 and 6 show an axial section and a view from below respectively of a further embodiment; and

Fig. 7 shows a part-sectional elevational view of a punching apparatus together with the die pertaining thereto, both arranged in a punching press.

In the drawings, the numeral 1 designates the punch and 2 the die co-operating therewith. In Fig. 1, the punch 1 has a small diameter, whilst in Fig. 2 the punch 1 has a large diameter. The punch 1 co-operates with a tubular stripper 3, whilst a spring shown in the drawings as a cup spring 4 is provided between the stripper 3 and a locking plate 5 disposed on the upper end of the punch 1. The punch, stripper, spring and locking plate are surrounded by an outer casing, and prevented from leaving the casing 6 at the lower end thereof in known manner. According to the invention, there is also an enclosure at the upper end, constituted by a pressing member 7 screwed into the outer casing 6. This pressing member 7 presses upon the top of the punch 1 through a spacer 8. In a threaded bore 9 of the pressing member 7, an adjusting screw 10 is provided, which is inactive when the punching apparatus is in operation. This means that the adjusting screw 10 does not then press against the spacer 8.

When the holder of the punching apparatus, which is to be handled as a unit, is to be located with respect to the supporting bed of a press, this is done by pressing the punch 1 outwards by means of the adjusting screw 10 (see Fig. 7). The punch 1 can then be readily inserted into the hole of a templet 15 held in the correct position, whereupon the holder 12 is secured to the supporting bed. By then screwing the adjusting screw back, the punch 1 will reach the position shown in Fig. 1, whereupon the punching apparatus is adjusted ready for use.

When the cross-section of the punch 1 has a radially symmetrical form, a locking device for preventing rotation of the tubular stripper 3 with respect to the outer casing 6 is superfluous. If, however, a punch is used which is not round, or when a number of punches are employed in one single punching apparatus, as in the case in Figs. 5 and 3 respectively, it will be necessary to provide the outer casing 6 with a guide key 11 which prevents the stripper 3 and consequently also the punch 1 from rotating. The provision of the spacer 8 makes it possible to use one single adjusting screw 10 to press the punches 1′ and 1″ (Fig. 3) outwards simultaneously for adjusting the punch holder.

As Fig. 7 shows, the punching apparatus according to the invention can be placed in the punch holder 12 as a unit. For returning the apparatus to its place with respect to the holder after a hole has been punched, use is made of a helical spring 13 (see Figs. 1-5) arranged around the outer casing, which spring is removed during the adjustment of the holder with respect to the supporting bed and presses at one end against a spring ring 14 clamped on to the pressing member 7 and at the other end against the holder 12. The holder 12 is secured to the supporting bed in known manner, after the correct adjustment with respect to a templet has been made in the manner described above.

Fig. 7 serves to show that replacement of punching apparatus according to the invention can be effected in a very simple way. It is further possible in a punching appa-

ratus, after unscrewing the pressing member 7, to dismantle a punch which might have have been worn away and to replace it or re-assemble it after the punch has been re-ground, adding at the same time a spacer or providing a thicker spacer according to requirements.

What I claim is:—

1. Punching apparatus having a perforating punch, a tubular stripper, a spring between the stripper and the punch, and an outer casing embracing these parts and preventing separation of these parts from the casing, in which the punch is adjustable with respect to the outer casing and the stripper in such a manner that the punch can be adjusted so as to protrude from the stripper.

2. Punching apparatus according to Claim 1, in which the end of the outer casing remote from the active end of the punch is provided with a pressing member, preferably secured by means of a screw thread, against which the head of the punch rests, with the addition, if desired, of intermediate spacing plates, the pressing member carrying an adjusting member for pressing the punch outwards.

3. Punching apparatus according to Claim 2, in which the adjusting member comprises an adjusting screw inserted axially into the pressing member.

4. Punching apparatus according to Claim 2, in which the adjusting member comprises a wedge or eccentric provided in a transverse bore of the pressing member.

5. Punching apparatus substantially as hereinbefore described with reference to the accompanying drawings.

6. A method of locating on a supporting bed of a press holders of punching apparatus as claimed in Claims 2, 3, 4 or 5 which comprises placing each punching apparatus in the correct position with respect to a templet after the punch has been pressed outwards by means of the adjusting member, locating the holder by inserting the protruding punch into a hole in the templet and securing the punch holder pertaining thereto to the supporting bed.

7. A method of locating holders of punching apparatus as claimed in any one of Claims 1 to 5 on a supporting bed of a press, substantially as hereinbefore described with reference to the accompanying drawings.

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3 SHEETS

COMPLETE SPECIFICATION

This drawing is a reproduction of the Original on a reduced scale

Sheet 1

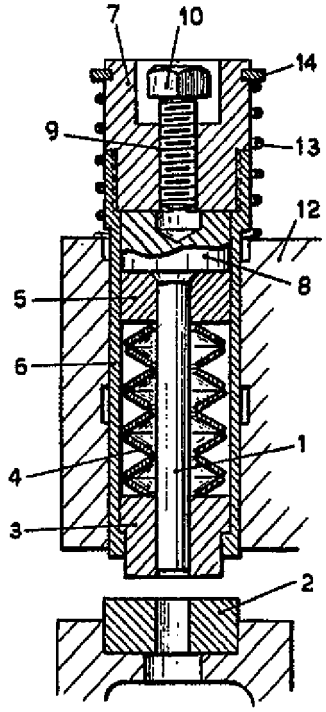

FIG. 1

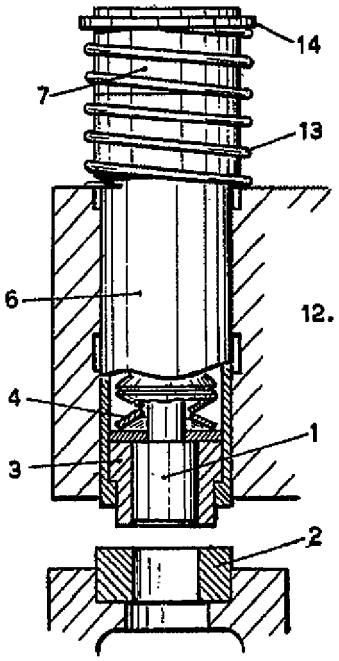

FIG. 2

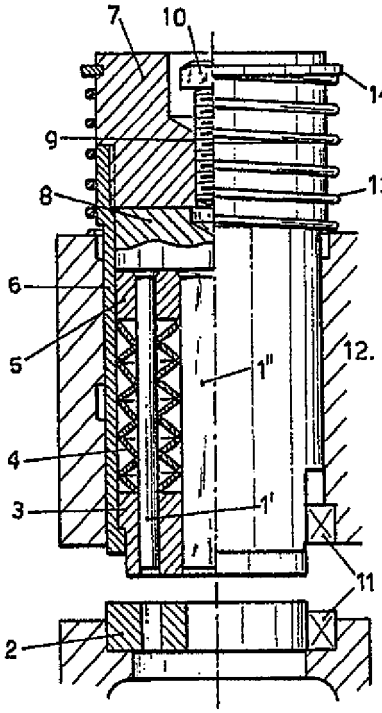

FIG. 3.

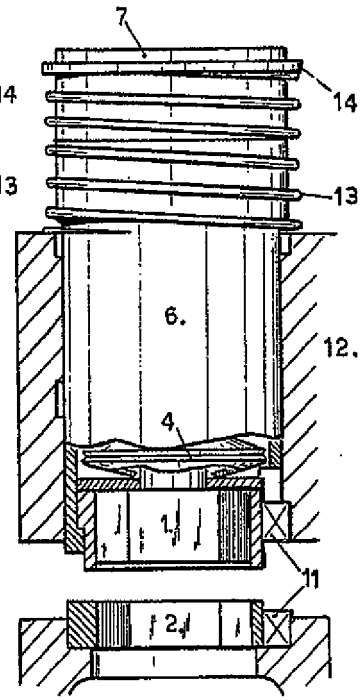

FIG. 5

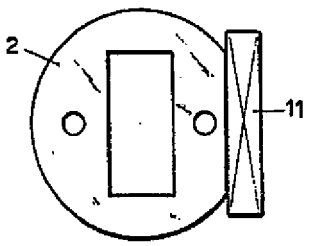

FIG. 4

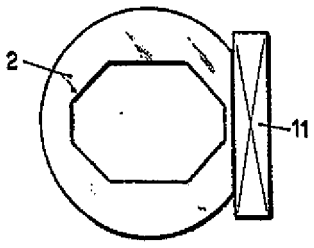

FIG. 6

789408 COMPLETE SPECIFICATION
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Sheets 2 & 3

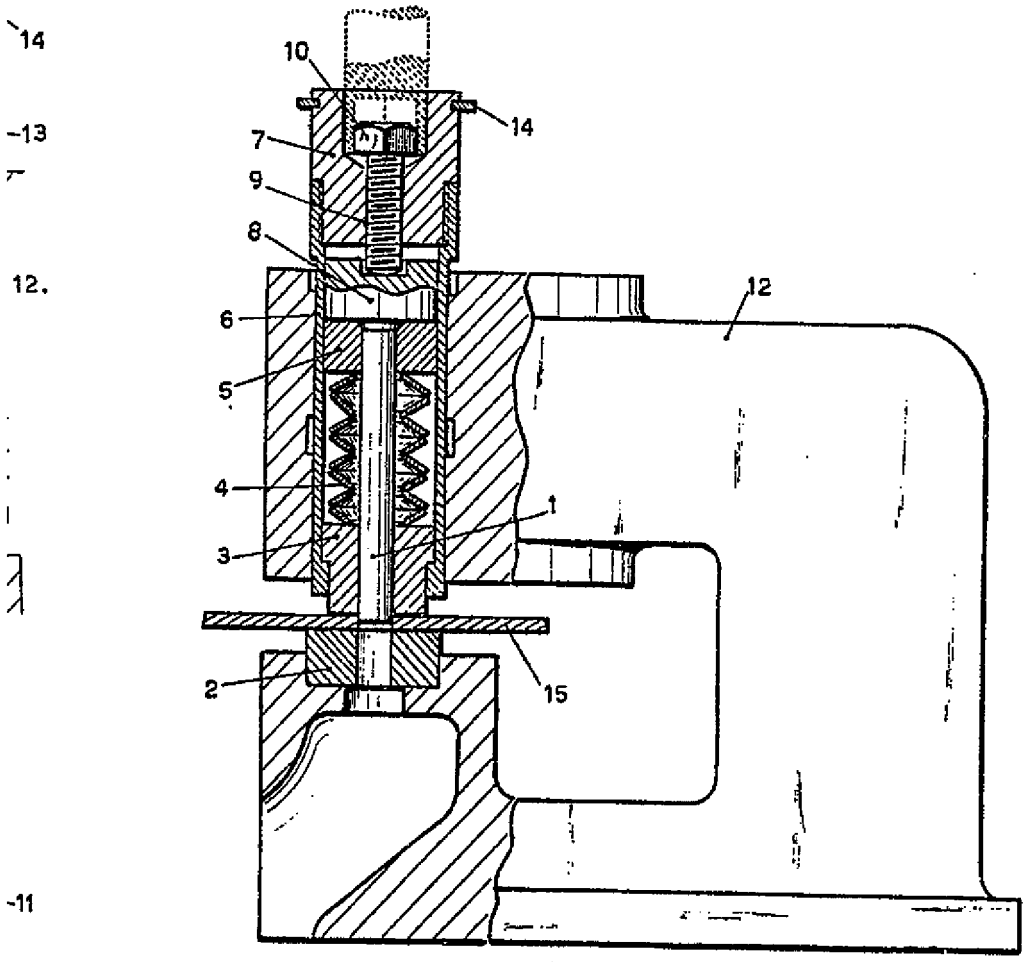

FIG. 7

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Sheets 2 & 3

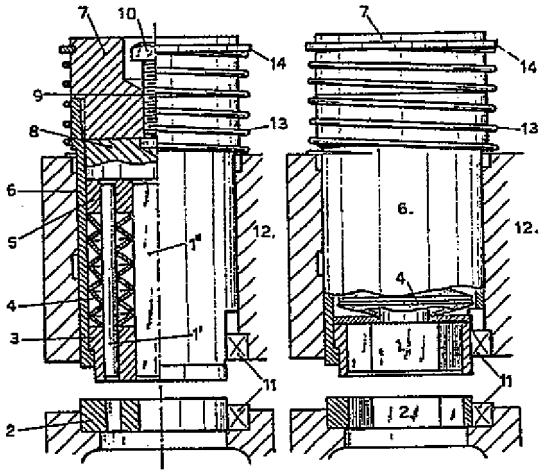

FIG. 3.

FIG. 5

FIG. 4

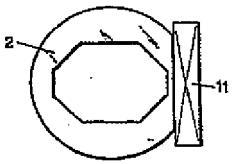

FIG. 6

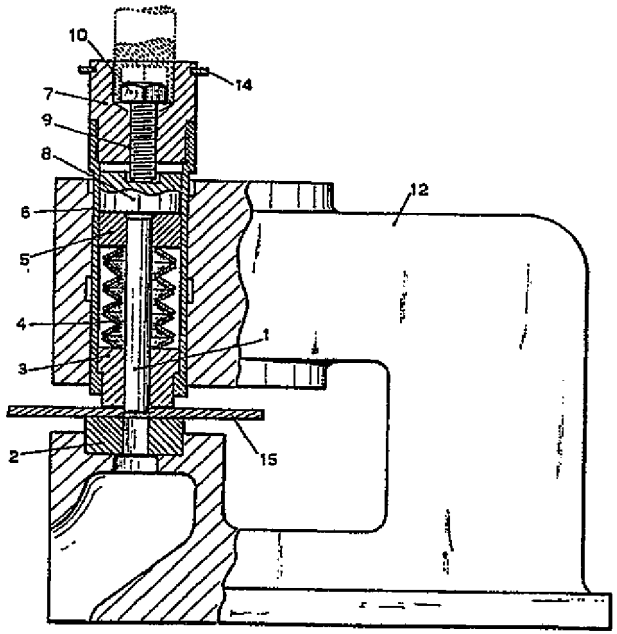

FIG. 7